IS 483 (1972): Fireclay Refractories for Oil-fired Boiler Furnaces of Naval Ships [MTD 15: Refractories]

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IS : 483 - 1972
(Reaffirmed 2002)

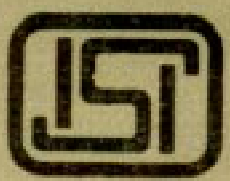
Indian Standard

SPECIFICATION FOR FIRECLAY REFRACTORIES FOR OIL-FIRED BOILER FURNACES OF NAVAL SHIPS

(First Revision)

First Reprint NOVEMBER 1974

UDC 666·762·16 : 621·181·1



INDIAN STANDARDS INSTITUTION
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110001

Price Rs 2·50

February 1973

Indian Standard

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(First Revision)

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Indian Standard

SPECIFICATION FOR FIRECLAY REFRACTORIES FOR OIL-FIRED BOILER FURNACES OF NAVAL SHIPS

(First Revision)

0. FOREWORD

0.1 This Indian Standard (First Revision) was adopted by the Indian Standards Institution on 25 October 1972, after the draft finalized by the Refractories Sectional Committee had been approved by the Structural and Metals Division Council.

0.2 This standard, prepared at the instance of the Naval Headquarters and the Directorate of Production and Inspection (Navy), Ministry of Defence, Government of India, was first published in 1953. Based on the experience gained during these years, it has been decided to revise the requirements for refractories covered by this standard to take care of the service requirements of naval ships.

0.3 This standard is intended to cover refractories for heavy duty services in the furnaces of oil-fired boilers of naval ships. It, however, does not preclude the use of fireclay refractories conforming to IS : 6-1967*, IS : 7-1967† and IS : 8-1967‡ if found suitable in certain locations.

0.4 This standard keeps in view the manufacturing and trade practices followed in the country in this field. In preparing this standard, assistance has also been derived from DGS/6860 November 1962 ' Specification for best quality aluminium firebricks ' issued by the Ship Department, Admiralty, Government of U.K.

0.5 For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS : 2-1960§. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

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*Specification for moderate heat duty fireclay refractories, Group ' A ' (*third revision*).

†Specification for moderate heat duty fireclay refractories, Group ' B ' (*third revision*).

‡Specification for high heat duty fireclay refractories (*third revision*).

§Rules for rounding off numerical values (*revised*).

1. SCOPE

1.1 This standard covers requirements for fireclay refractories primarily intended for use in furnace lining of oil-fired boilers of naval ships. It relates only to burnt fireclay refractory bricks and shapes.

2. GENERAL REQUIREMENTS

2.1 General requirements relating to the supply of the refractories shall be as laid down in IS : 1387-1967*.

2.2 The refractories shall be compact, of homogeneous texture and free from cracks, voids, folds and other flaws. They shall be burnt evenly throughout and shall have no soft corners and have sufficient mechanical strength.

2.3 The refractories shall have a high resistance to slagging from sea water contamination of fuel oil together with the natural ash of fuel oil.

3. TOLERANCE ON SIZE

3.1 Variations from specified dimensions, covering both warpage and shrinkage, shall be allowed to the extent of $\pm 1{\cdot}5$ percent or $\pm 1{\cdot}5$ mm whichever is greater.

3.2 The flatness of each surface shall be measured with a straight edge across any diagonal, the convexity or concavity of any surface shall be not more than 2 percent of the length of the diagonal.

4. CHEMICAL COMPOSITION

4.1 The alumina content of the refractories, when determined in accordance with IS : 1527-1972† or in IS : 1335-1959‡, shall be not less than 40 percent.

5. PHYSICAL REQUIREMENTS

5.1 The refractories shall conform to the requirements given in Table 1.

6. MARKING

6.1 The refractories shall be clearly marked with the manufacturer's name or trade-mark and any other identification mark as desired by the purchaser.

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*General requirements for the supply of metallurgical materials (*first revision*).

†Methods of chemical analysis of high silica refractory materials (*first revision*).

‡Method for the direct determination of alumina in refractory materials (*tentative*).

TABLE 1 PHYSICAL REQUIREMENTS FOR FIRECLAY REFRACTORIES FOR OIL-FIRED BOILER FURNACES OF NAVAL SHIPS

(*Clause* 5·1)

Sl No.	Characteristic	Requirements	Method of Test (Ref to Cl No. of IS : 1528-1962*)
(1)	(2)	(3)	(4)
i)	Pyrometric cone equivalent, standard pyrometric cone (ASTM) No., *Min*	32½	3
ii)	Refractoriness under load, °C, *Min* :		4
	a) t_a	1 400	
	b) t_0	1 600	
iii)	Spalling resistance, loss in weight, percent, *Max*	5	5·1
iv)	Apparent porosity, percent, *Max* :		9
	a) Hand-moulded refractories	28	
	b) Machine-moulded refractories	25	
v)	Permanent linear change after heating for 2 hours at 1 400°C, percent, *Max*	±0·50	8

*Methods of sampling and physical tests for refractory materials.

6.1.1 The refractories may also be marked with the ISI Certification Mark.

NOTE — The use of the ISI Certification Mark is governed by the provisions of the Indian Standards Institution (Certification Marks) Act and the Rules and Regulations made thereunder. The ISI Mark on products covered by an Indian Standard conveys the assurance that they have been produced to comply with the requirements of that standard under a well-defined system of inspection, testing and quality control which is devised and supervised by ISI and operated by the producer. ISI marked products are also continuously checked by ISI for conformity to that standard as a further safeguard. Details of conditions under which a licence for the use of the ISI Certification Mark may be granted to manufacturers, or processors, may be obtained from the Indian Standards Institution.

7. SAMPLING

7.1 Unless otherwise specified, the representative sample shall be drawn according to **2** of IS : 1528-1962*.

*Methods of sampling and physical tests for refractory meterials.